INTERIM REMEDIAL ACTION REPORT

Operable Unit 02
Vapor Mitigation Phase

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE
Ashland, Massachusetts 01721

CERCLIS ID NUMBER MA D990685422

Prepared by US EPA Region I
Approved by:

6/30/05

Larry Brill, Chief OSRR I **Date**

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VAPOR MITIGATION (OU2)

I. INTRODUCTION

The Nyanza Chemical Waste Dump Superfund Site ("Nyanza Site" or "Site") occupies 35 acres on the north and south sides of Megunko Road in the Town of Ashland, Massachusetts, located in Middlesex County, approximately 35 miles west of the City of Boston. Although Megunko Road is the location of commercial and industrial properties, the immediate area is dominated by dense residential development. See Figure 1.

The Nyanza Site property was occupied from 1917 to 1978 by a succession of companies involved in the production of textile dyes. The last of these companies was Nyanza, Inc. Large volumes of industrial waste water generated by these companies and containing high levels of acidity and numerous organic and inorganic chemicals, including mercury, were partially treated and discharged to a large buried concrete "vault." The vault was used as a settling basin from which liquid wastes were then discharged to the nearby Sudbury River via a small stream referred to as Chemical Brook. Chemical sludges generated by the waste water treatment processes, along with spent solvents, were disposed of in an on-Site landfill. The vault was taken out of service sometime in the late 1960's or early 1970's and filled with sludge. Nyanza, Inc. connected to the regional sewer system in March of 1970.

The first type of contamination linked to the Site was mercury, which was discovered in the Sudbury River in 1970 as part of an overall investigation of regional mercury in Massachusetts surface water bodies. Beginning in 1972, the Commonwealth of Massachusetts required Nyanza, Inc. to conduct several studies culminating in the release of a Preliminary Site Assessment Report in 1980.

The Nyanza Site was included on the original National Priorities List ("NPL") published in 1982. EPA began a fund-lead Remedial Investigation and Feasiblity Study ("RI" and "FS" or "RI/FS") in 1984. In January of 1987, EPA and the Commonwealth of Massachusetts conducted a joint removal of sludge from the vault area.

The Nyanza Site was subsequently divided into four Operable Units ("OUs"). The subject of this Interim Remedial Action Report, vapor mitigation, is considered a phase of Operable Unit 2 ("OU2") and is discussed in Section II of this report. A brief summary of the remaining three operable units follows.

- OPERABLE UNIT 1 (source control)

On September 4, 1985, EPA issued a Record of Decision ("ROD") designating areas of soil and sediment contamination as Operable Unit 1 ("OU1"). Areas of contaminated soil, sediment and sludge were excavated and consolidated with solid waste in the former on-site sludge disposal area. A non-permeable hazardous waste type layered cap was then constructed. A diversion trench was constructed to help "dewater" the landfill, and then a fence was constructed around the landfill and diversion trench.

- OPERABLE UNIT 3 (source control)

On March 30, 1993, EPA issued a ROD requiring the removal of additional source areas. OU3 extended the excavation from OU1 to include mercury contaminated sediments discovered in adjacent wetlands and drainage ways extending to the Sudbury River. The excavated sediments were consolidated in the on-Site landfill.

- OPERABLE UNIT 4 (management of migration)

In 1992, EPA issued an RI Report which provided an initial assessment of the nature and extent of contamination present in the Sudbury River. Additional studies have been ongoing and EPA recently issued a Draft Ecological Risk Assessment for OU4 on April 18, 2008. Sediments containing elevated concentrations of mercury have been detected approximately 26 miles down stream from the Site. A ROD is planned for 2009.

II. OPERABLE UNIT BACKGROUND

OU2 ROD

A ROD for OU2 was signed on September 23, 1991 as a management of migration remedy for contaminated groundwater and included the following activities:

- Extraction and on-Site treatment of contaminated overburden groundwater from the northern portion of the Site (just north of the railroad tracks) for a minimum of 5 years;
- Discharge of treated groundwater into the Sudbury River;
- Establishing institutional controls to limit access to portions of the Site;

- Conducting pump tests to determine the feasibility of expanding groundwater treatment to the eastern portion of the plume;
- Installing additional bedrock wells;
- Continued monitoring of existing residential and monitoring wells;
- Inspecting a water line on Megunko Road; and
- Completing pre-design studies.

The ROD for OU2 was intended as an interim remedy to take action to protect public health and the environment in the short term while additional studies were to be performed to assess the contaminant response to initial remedial efforts. It was anticipated that the interim remedy would operate for five years, following which a final remedy and a final ROD for OU2 would be issued. As an interim remedy, specific numeric remedial goals were not established.

In accordance with the OU2 ROD, EPA began design of a groundwater extraction and on-Site treatment system in 1992. In 1994, a pilot-scale treatment system was constructed, which was intended to refine extraction rates and treatment processes.

DNAPL

However, when EPA started the system, dense non-aqueous phase liquid ("DNAPL") was discovered in a pump test extraction well located on the northern portion of the Site. The presence of the DNAPL raised concerns about the effectiveness of the planned extraction and treatment remedy. The treatment system was not designed to handle influent containing DNAPL. As a result, the pilot-scale treatment system was not tested and the full-scale design was postponed indefinitely.

A groundwater monitoring program was initiated in 1998 to assess plume migration and any changes in contaminant concentrations. Approximately 30 wells were sampled on a semi-annual basis for volatile organic compounds ("VOCs"), semi-VOCs and metals. Elevated concentrations were found in both the overburden (shallow) and bedrock groundwater that exceed federal and state drinking water standards. The monitoring program continued through the Fall of 2003. The results indicate that the DNAPL is an ongoing source of groundwater contamination.

Vapor Mitigation

The vapor mitigation phase of OU2 is the subject of this remedial action report. The contaminated shallow groundwater plume extends under numerous homes, businesses and municipal buildings. Elevated concentrations of certain VOCs, trichloroethene ("TCE") in particular, within the contaminated groundwater plume prompted EPA to conduct an indoor air sampling program in 1998 to determine if a complete vapor intrusion pathway existed. TCE and four other contaminants were detected in eight (8) of the nine (9) homes sampled, and at the Town Hall

and police station. TCE was detected at concentrations ranging from 6.4 to 7.3 $\mu g/m^3$, which were all below the existing screening level of 134 $\mu g/m^3$.

A second indoor air sampling program was conducted in 2004. TCE and four other contaminants were detected in five (5) of the seven (7) homes sampled. The Town Hall and police station were not sampled. TCE was detected at concentrations ranging from 1.3 to 2.9 $\mu g/m^3$, which again were all below the existing screening level of 134 $\mu g/m^3$. However, in 2001, EPA proposed a lower inhalation standard for TCE based on new toxicity information. Application of the proposed toxicity information resulted in a screening level range of 2 to 43 $\mu g/m^3$. Exceedance of the proposed screening level range in several homes prompted EPA to complete a focused risk assessment using all the available air data from Nyanza. The risk assessment concluded that use of the proposed TCE toxicity information resulted in a potentially unacceptable risk from continued long-term inhalation of TCE vapors in seven (7) of the fourteen (14) homes sampled, and in the Town Hall.

ESD

Based on the focused risk assessment, EPA signed an Explanation of Significant Differences ("ESD") for OU2 on September 29, 2006 that included the following activities:

- Installation of initially five (5), and up to as many as fifty (50), vertical extraction wells equipped with belt-skimmers, pumps or a similar extraction method, to determine the ability to physically extract the DNAPL;
- The installation, on a voluntary basis, of vapor mitigation systems in about **45 to 50** structures (mostly homes);
- Performance of routine groundwater monitoring;
- Performance of additional air testing;
- Installation of small diameter monitoring wells or piezometers to more accurately determine the extent of the shallow groundwater plume, and
- Clarification of institutional controls to prevent exposure to contaminated groundwater.

The ESD did not modify the general goals for groundwater remediation, but furthered these goals by creating two distinct remedial phases. Installation of the vapor mitigation systems was completed as the first phase to address the exposure pathway. The Installation of the DNAPL extraction wells will follow in the second phase currently underway.

Remedial Design

Inspections of each proposed vapor mitigation property were performed by the United States Army Corp of Engineers ("USACE") from October 3rd to 28th, 2006. Based on the requirements of the ESD, and the property inspections, a conceptual design was prepared by USACE on December 22, 2006, for the

construction of approximately 40 to 50 sub-slab depressurization systems. The final number of systems would be determined by additional indoor air testing. The conceptual design showed a typical system layout and components, leaving the final system details to the installation contractor to design a system based on the physical and air flow characteristics of each property.

USACE finalized a work plan, which contained a layout for each specific system, on February 12, 2007.

III. CONSTRUCTION ACTIVITES

Pre-Construction Activities

The ESD required that certain pre-construction activities by performed to more accurately delineate the vapor mitigation area. Between November 13 and 18, 2006, indoor air and soil gas samples were collected by EPA from seven residential properties, two brick apartment buildings, a retirement complex containing one small and two large apartment buildings and a multi-use commercial/industrial complex. On November 15 and 16, 2006, six one-inch diameter wells were installed along the edges of the plume using a vibratory hammer. The wells were screened at the water table and subsequently sampled for VOCs in December 2006, along with some nearby existing monitoring wells.

This soil gas, air and groundwater data resulted in the addition of two residential properties to the list of those contained in the ESD where vapor mitigation systems would be offered. The final number of properties to be offered systems was 41. The locations of these properties are shown on the map provided in Appendix A.

Site Preparation

Site preparation activities began on May 21, 2007, and included mobilization to the Site for grading and clearing of a local Town-owned parcel to be used for an office trailer, as well as an equipment staging and storage area. A temporary six-foot chain link fence was installed around the perimeter of the property for safety and security.

Installation of Vapor Mitigation Systems

Actual construction activities began on May 24, 2007. Construction at each of the properties included the following basic steps;

- Baseline air monitoring for worker health and safety,
- Video documentation of existing conditions,
- Meeting with the property owner to discuss system placement and any logistics issues,

- Removal and storage of basement and crawlspace contents (only if significant sealing requirement),
- Abatement of asbestos pipes and abandoned furnaces as needed,
- Disconnection, removal and/or temporary suspension of furnaces, hot water tanks and oil tanks as needed,
- Pouring of concrete floors in any dirt basement or crawlspace areas,
- Building inspection for local code compliance as needed,
- Sealing of all cracks and gaps in existing basement floors and walls as needed;
- Sealing of any sump pumps and floor drains,
- Installation of two or more pressure monitoring points in the basement floor and performing vacuum tests to determine the baseline building pressure,
- Installation of extraction pit or pits,
- Installation of internal piping,
- Installation of manometer and pressure alarm,
- Installation of external pipe stack and mitigation fan,
- System wiring,
- Electrical inspection for local code compliance,
- System start-up test and verification of target pressure at the pressure monitoring points,
- Performance of a back draft evaluation at each property,
- Placement of removed basement contents,
- Preliminary and final inspections,
- Instructional meeting with the property owner, and
- Preparation of an as-built drawing.

The contractor used two or three crews and typically worked on three to six active properties concurrently. The overall duration spent at each property ranged from a minimum of two days to three weeks, depending on the complexity and conditions of the property. The typical duration was three days. A total of 43 systems were installed in 40 properties.

One property owner refused access for the purpose of installing a system, or collecting indoor air and soil gas data. This property houses two apartments. Both tenants were informed of the owner's refusal to install a mitigation system. A notice was provided to the local board of health to help ensure that any future tenants are made aware of the possible vapor intrusion concern. EPA determined that deed restrictions are not appropriate for this property since no actual data exists to confirm that an inhalation health risk exists.

The final property installation was complete on September 28, 2007. Demobilization was complete on October 8, 2007. Through the four month construction duration, the contractor provided daily updates and weekly construction meetings were held.

Condensation Issues

Sub-slab depressurization systems necessarily produce significant internal moisture both from the moist soil beneath the typical basement floor, and from condensation of stack effluent during cooler temperatures. Each system was installed with a ¼" flexible insulated tube, which served as a "condensate bypass" intended to allow moisture to drip back into the suction pit. However, on October 13, 2007, it became apparent that the condensation bypass was not adequate for the volume of condensation being produced. Therefore, in late October, the existing bypass was replaced with ¾" flexible insulated tubing at all properties. Also, separate condensate drains were installed at three properties where proper slopes were not possible. In these cases, a ¾" flexible insulated tube was installed at the bottom of the low point of the horizontal pipe and was extended vertically into a hole drilled in the slab below. The interface between the drain tube and the slab was sealed to prevent vapor seepage.

On December 23, 2007, smoldering wires were reported in the external service switch box for one of the mitigation systems. As a result, all property owners were instructed to turn off their systems at the breaker panel. Upon subsequent inspection, it was determined that excess condensate had entered the wire connection junction box pre-mounted to the vapor mitigation fan unit. The water then traveled to the external service switch box through the wire conduit. The switch box filled with water at a rate too slow to trip the breaker. This resulted in the smoldering wires. Subsequent inspection determined that accumulated water was present in 13 of the systems.

From March 17 to March 21, 2008 all but one fan was replaced with a different model that appears to be designed to more effectively mitigate condensation concerns. The one fan not replaced is located in an attic, rather than outside.

Post-fan replacement pressures were measured at the manometer for each system, and verified at the pressure monitoring points at about twenty percent of the properties (where immediate basement access was possible).

Appendix A contains the performance data for the systems at each property.

IV. CHRONOLOGY OF EVENTS

This remedial action required the installation of 43 sub-slab depressurization systems in 40 different residential properties. This work was performed between May 24 and September 28, 2007. Up to three crews worked currently on up to six active properties on a daily basis. Daily updates were provided by the installation contractor and weekly construction meetings were held on-site. Rolling joint inspections were conducted by USACE, EPA, MassDEP, the prime

consultant and the installation contractor as work on each property was completed. Rather than provide a daily chronology of event, Table 1 below summarizes the milestones that are consistent with the requirements of the guidance document.

TABLE 1: Chronology of Events

DATE	EVENT
September 29, 2006	ESD for OU2 approved.
September 29, 2006	Mailed request for access forms to 41 property owners.
October 3 – 28, 2006	Completed inspections of each property.
November 13 – 18, 2006	Sampled indoor air and soil gas from 11 properties.
November 15 & 16, 2006	Installed 6 shallow monitoring wells.
November 30, 2006	Sampled 8 shallow groundwater wells.
December 22, 2006	Conceptual Design of mitigation systems finalized.
February 12, 2007	Work Plan for installation of mitigation systems finalized.
April 29, 2007	Mailed confirmation letters to each property owner.
May 21, 2007	Site mobilization. Prepare staging area. Install trailer.
May 23, 2007	First weekly construction meeting.
May 24, 2007	Began sealing basements and installing VMS.
September 28, 2007	Final VMS installed.
October 5, 2007	Demobilization.
November 26 - 28, 2007	Replaced condensate bypass on all VMS.
March 17 – 21, 2008	Replaced all VMS fans.
April 10, 2008	Operational & Functional Report to MassDEP.
May 1, 2008	MassDEP begins O&M.

V. Performance Standards and Construction Quality Control

The performance standard is not media specific, but rather is based on the principal of attaining a minimal negative pressure at each property to ensure capture of the vapors. The performance standard was set at 0.004 inches of water column (1 Pascal) based on MassDEP guidance.

At each property, a minimum of two permanent pressure monitoring points were installed in the basement floor for each suction pit. One monitoring point was placed in the furthest corner of the basement floor from the suction pit, and a second point was installed mid-way between those two points. Readings were collected at each property following start-up of the fan to ensure compliance with the performance standard at all monitoring points. Following replacement of the fans due to the condensation problem described in Section III, pressure readings were verified for all properties where access to the basement was possible.

Overall, the data conclude that all measured pressures were greater than the required performance standard of 0.004 inches of water column, and that there was good correlation between the readings obtained during operation of the original and replacement fans.

Appendix A contains a table which summarizes the performance data for each property.

A Quality Assurance and Quality Control ("QA/QC") program was conducted as required by the Quality Assurance Project Plan ("QAPP"). This program consisted of the following primary components;

- Pre-construction meetings at each property.
- Daily inspections and completion of a daily construction quality control form by the prime consultant.
- Regular random inspections by USACE, EPA or MassDEP.
- Discussions regarding quality control issues at weekly progress meetings.
- Post-installation inspections of each property by the prime consultant, USACE, EPA and MassDEP. This inspection included a verification of the performance standard.
- Post-construction meetings at each property.

QA/QC issues were mostly associated with efforts necessary to seal the basement, including the absence of caulk where required, or poor application of parge coating where extensive sealing of field stone walls was required.

More significant QA/QC issues and the final resolutions are summarized as;

- Excessive condensation leaked from the fan motors into the electrical components of one of the systems, causing a pre-combustion fire hazard. *This problem was resolved by carefully diagnosing the cause as internal condensation as opposed to precipitation infiltration. This condition was found to be present in 13 of the 43 systems. It was determined that a fans supplied by the installation contractor were not appropriate designed to prevent contact between condensate and the electrical components. New fans were purchased and installed at each property under a cost-share arrangement that appear to be designed in a manner to minimize moisture contact with electrical components.*

- The condensation bypass was undersized. This caused pooling of condensation above the fan on some systems to the extent that airflow was restricted. As a result, the pressure alarms would sound. *This problem was resolved by replacing the ½" inner diameter bypass tubing with larger 5/8" outer diameter tubing at each system.*

- The discharge pipe from newly installed sump pits often had a loose seal as supplied by the manufacturer. This could result in a vapor leak or compromise the pressure field. *This problem was resolved by installing an epoxy around each pipe fitting.*

VI. Final Inspection and Certification

Pre-final and final inspections were conduction on a rolling basis throughout the construction period. An Operational and Functional Completion Report was sent to MassDEP on April 10, 2008. The cover letter for that report documents that EPA and MassDEP agree that the rolling inspections satisfied the requirements of pre-final and final inspections.

With regard to health and safety requirements, a Health and Safety Plan was prepared. Most of the construction work, such as sealing cracks, grading dirt floors, pour concrete and installing vapor system components, was performed in Level D. A modified Level D involved the use of dust masks and latex gloves at some properties. Daily air monitoring was performed at each active property. A few of the crawl spaces required additional safety measures as confided space entries. Four of the properties required asbestos abatement. Two of these properties required full containment zones. During these activities, only licensed abatement contractors were allowed in the basements.

VII. Operation and Maintenance Activities

The first vapor mitigation systems began operation in late May 2007. The last installed system began on September 28, 2007. The systems were temporarily shut down between December 23, 2007 and March 21, 2008 to diagnose the condensation problem and then replace all the fans. MassDEP agreed that the Operational and Functional period ended on April 30, 2008.

MassDEP began Operation and Maintenance ("O&M") of the 43 vapor mitigation systems on May 1, 2008. EPA and MassDEP do not have any regulatory requirements which dictate how to maintain a vapor mitigation system. The systems are largely maintenance-free with the fan motor representing the only moving parts. Future activities are anticipated to mainly involve service calls. No future indoor air monitoring of these properties in planned.

For Nyanza OU2, it has been agreed that MassDEP will perform the following O&M activities;

- MassDEP has established a dedicated phone number for property owners to call with service concerns or questions.

- All systems will be inspected and pressures verified at both the manometer and pressure points in the Fall of 2008.
- Subsequently, full inspections will be performed at approximately 10% of the properties (4 to 5) on an annual basis. At the remaining properties (38 or 39), an external inspection only will be performed. The external inspection will verify that the fan is operational. Further inspections will be performed as needed.
- Prior to each EPA required 5 year review, a full inspection will be performed at each property where access is possible.

VIII. Summary of Project Costs

Table 2 below provides a summary of project costs including a comparison of the estimated and actual incurred costs. In addition to vapor mitigation, the ESD required construction and operation of a DNAPL recovery system. The total estimated cost of the remedial action for both phases, as cited in the ESD, was $3.6 million. However, the ESD does not include a breakdown of costs among the various phases. Therefore, the estimated costs in Table 2 below are from the December 22, 2006 conceptual remedial design report for the vapor mitigation phase of the remedial action. Because specific details regarding the actual properties were not known at the time of the conceptual remedial design, the cost estimate provides a range based on various anticipated property conditions (i.e., dirt floor, field stone walls, poured concrete, etc.). The estimates below provide the low and high ends of the range. Actual costs were complied by USACE. Further cost details are provided in Appendix A.

TABLE 2: Cost Summary

Cost Item	Estimated Cost	Actual Cost
RA Capital Cost Range[1]	$178,057 - $478,409	$1,438,194
Oversight Cost Range	$36,000 - $84,000	$255,157
TOTAL REMEDIAL COST	$214,057 - $562,409	$1,693,351
Difference Between Total Estimated and Actual Cost	+$1,130,942 to +$1,479,294 Or +115% to +140%	
Projected O&M Cost[2]	$48,000 per year	Unknown

Explanation for Increased Costs

[1] Based on per-property estimates in the *Conceptual Design for Vapor Mitigation Systems*, ICF, December 22, 2006.

[2] Projected cost is based on anticipated electricity costs of $10 per month per property necessary to operate the fans. This estimate was calculated by USEPA Region I based on fan consumption information provided by the vendor and regional electric rates. The property owners pay for the electricity so actual costs are not known. The maintenance costs for MassDEP have not yet been estimated, but are expected to be limited to annual inspections and infrequent service calls.

The actual costs exceeded the high end of the remedial action cost estimate by about 115% due to the following factors;

- Installation of vapor mitigation systems is an emerging field, which limited the pool of contractors. Existing Radon contractors possess the expertise to install mitigation systems, but were found to not be OSHA certified, or to meet other federal contracting requirements.
- The RA cost estimate did not anticipate the need for a local staging area. A staging area was necessary to store the VMS components, soil removed from basements, and placement of support equipment including an office trailer and storage shed. Local land was leased from the municipality.
- The RA cost estimate did not include the cost for obtaining electrical and building permits from the municipality. While permit fees are typically exempt under CERCLA, electrical permits were required by the licensed electrician for all properties and building permits were required by the local inspector where new concrete floors were installed (approximately 20 permits.)
- The RA cost estimate failed to include the cost of an electrician.
- The RA cost estimate did not anticipate the presence of any crawl spaces. About half the properties had at least one crawl space, and some had up to 4 individual crawl spaces. Each space required extensive sealing including pouring of a new concrete floor. Most spaces required a separate suction pit and associate piping. Some spaces were confined entries which increased labor costs.
- The RA cost estimate did not anticipate the need to remove, temporarily store and then replace basement contents.
- The RA cost estimate did not anticipate the need to hire an asbestos abatement contractor which was necessary at four properties in order to safely perform the necessary sealing activities.
- The RA cost estimate did not anticipate the need to install new sump pits and pumps in several properties.
- The RA cost estimate did not include pre- and post-construction meetings with each property owner.
- The RA cost estimate greatly underestimated the effort involved to seal a basement. Applying a parge coat to fieldstone walls proved to be particularly labor intensive.
- Significant condensation was encountered. Although condensation bypass tubing was installed as recommended by draft guidance documents available in 2006, the amount of condensation encountered required replacing all the bypass tubing with increased condensation.
- The fans were later determined to have a design flaw that lead to a safety hazard. All the fans were replaced under a cost-share arrangement with the installation contractor. This increased material and labor costs, and extended the overall performance schedule by three months.

- The RA cost estimate only assumed one fan per property. One property required three fans, and a second required two fans.

IX. OBSERVATIONS AND LESSONED LEARNED

- The actual costs to install the sub-slab depressurization systems were greatly underestimated due to the unique and largely unanticipated conditions present at the 40 individual properties. Inspections of each property are necessary to formulate accurate estimates.
- Initially three of the 41 property owners refused systems. Two later agreed to have systems installed. The one property where EPA was refused access to install a system is a two-family apartment. There is no indoor air, soil or groundwater data from this property. Notice was sent to the tenants and local board of health. At future projects, deed restrictions may be appropriate if there is a confirmed inhalation risk at a refusal property.
- Another significant factor is that the pool of available contractors was limited. As more vapor mitigation systems are installed, it is expected that a larger pool of contractors with proficiency in various vapor mitigation techniques will become available.
- The volume of condensation produced by these systems was far greater than anticipated. This condition resulted in the need to increase the diameter of the condensate bypass tubes in each system beyond what was recommended in the available guidance. In cold climates, it is recommended that a minimum 5/8" outer diameter insulated tube be used for the condensate bypass.
- The most significant lesson learned is that not all mitigation fans are designed and manufactured to the same quality. The actual fans initially installed were selected by the contractor based on required performance and were purchased from a major radon vendor. Although these fans are UL listed for external installation, they are not designed in a manner to prevent the movement of condensation from the internal fan housing to the electrical connections. This problem was further exacerbated by what appears to be an inconsistent application of caulk around the wires which exit the fan motor housing. This resulted in the gradual overheating of the electrical connections, which caused the wires to smolder, and nearly combust. This resulted in the 3 month shut down of all 40 systems and significant research on behalf of the project team to identify the source of the problem. All fans had to be replaced. It is recommended that fans be closely inspected prior to installation to ensure that the electric connections are adequately isolated from internal system moisture.

X. OPERABLE UNIT CONTACT INFORMATION

EPA Project Manager

Jim DiLorenzo
US EPA Region I
Office of Site Remediation and Restoration
One Congress Street (HBO)
Boston, MA 02114
Dilorenzo.jim@epa.gov
(617) 918-1247

State Project Manager

Dave Buckley
Mass DEP
One Winter Street
Boston, MA 02108
(617) 556-1184

US Army Corp of Engineers Project Manager

K.C. Mitkevicius
USACE, New England District
696 Virginia Road
Concord, MA 01742
(978) 318-8002

Nobis Engineering Project Manager (Oversight Contractor)

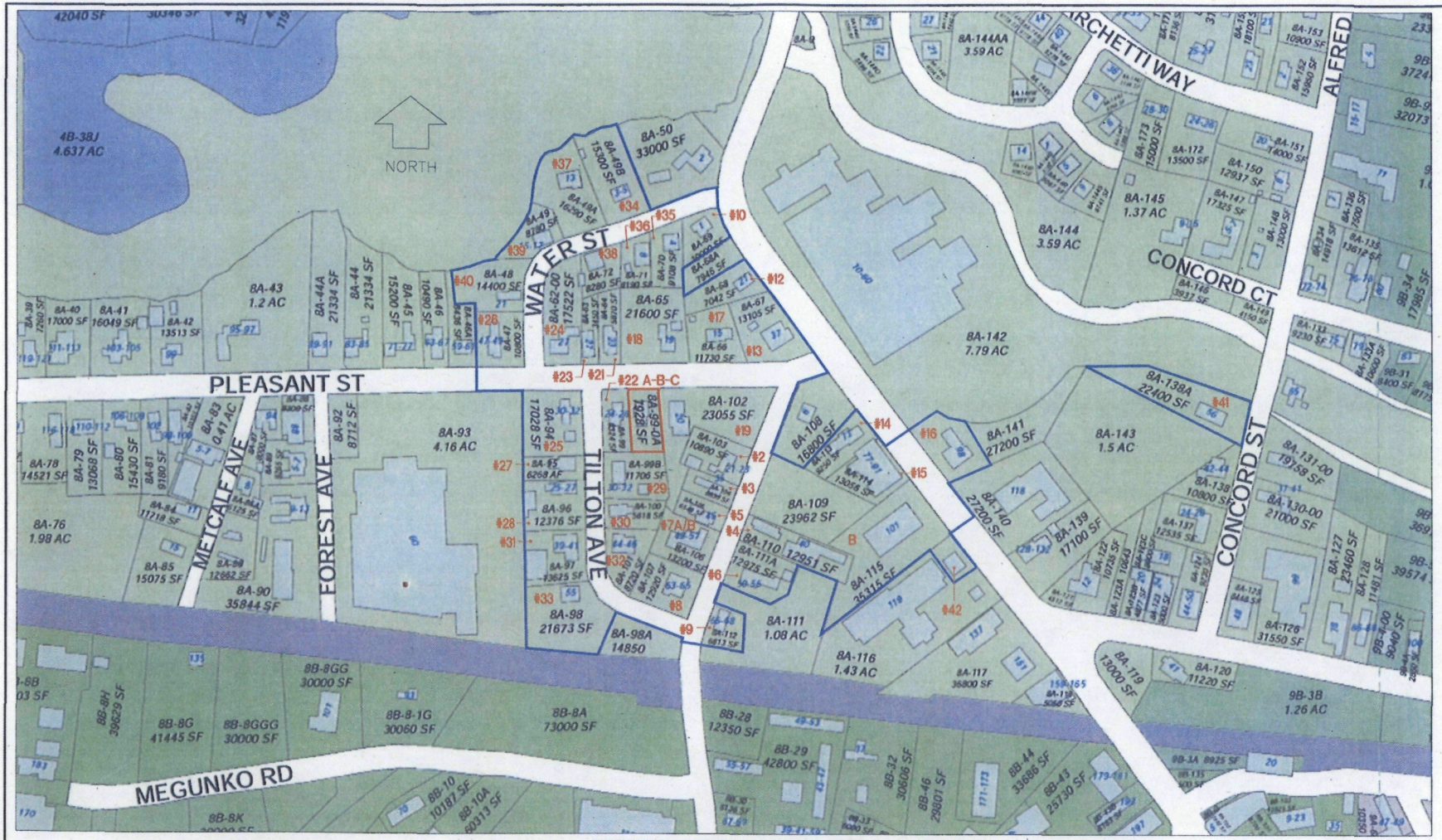
Kurt Jelinek
Nobis Engineering, Inc.
18 Chenell Drive
Concord, NH 03301
(603) 224-4182

Enpro Services Project Manager (Installation Contractor)

Daniel Trafford
Enpro Services, Inc.
12 Mulliken way
Newburyport, MA 01950
(978) 465-1595

APPENDIX A

Property Location Map
Performance Data
Cost Detail



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

KEY:

#40 PROPERTY #

FINAL VAPOR MITIGATION BOUNDARY

NO SYSTEM INSTALLED

NOTES:

1. BASEPLAN REPLICATED FROM TOWN OF ASHLAND TAX ASSESSORS MAP#8.

DATE: 1/23/07
PROJECT NO.: 74060
FILE NAME: WORK PLANS
SUPERFUND SITE: NYANZA
PREPARED BY: AMY ADAMS
CHECKED BY: KURT JELINEK

NOBIS ENGINEERING, INC.
18 Chenell Drive
Concord, New Hampshire
03301

US Army Corps of Engineers
New England District

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE
ASHLAND, MASSACHUSETTS

PROPERTY LOCATIONS

FIGURE 3

		PERFORMANCE								
		Original System Startup Results				Final System Startup Results				
Property	Fan Size	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Special Conditions
2	HP2190	8/15/2007	Far	0.030	1.8	3/24/2008	Far	0.013	1.6	
			Mid	0.038			Mid	0.031		
			Opposite	0.018			Opposite	0.012		
3	HP2190	8/30/2007	Mid	0.027	2.0		Mid		1.8	No access to this property on 3/24 or 3/25/2008
			Far	0.011			Far			
			Crawlspace	0.008			Crawlspace			
4	HP2190	8/15/2007	Mid	0.082	2.0	3/24/2008	Mid	0.071	2.1	
			Far 1	0.016			Far 1	0.016		
			Far 2	0.014			Far 2	0.011		
5	HP2190	6/6/2007	Mid	0.030	1.7	3/25/2008	Mid	0.011	1.5	
			Far	0.005			Far	0.009		
6	HP2190	6/29/2007	Mid	0.012	1.9	3/24/2008	Mid		1.6	Basement locked. No access to inside monitoring points. Checked Crawl.
			Far 1	0.008			Far 1			
			Far 2	0.012			Far 2			
			Crawlspace	0.014			Crawlspace	0.015		
7A	HP2190	6/22/2007	Far	0.012	2.0	3/24/2008	Far	0.014	1.8	
			Mid	0.037			Mid	0.028		
			Far	0.030			Far	0.015		
			Mid	0.032			Mid	0.023		
7B	HP2190	6/21/2007	Mid	0.023	1.9	3/24/2008	Mid	0.016	1.9	
			Far	0.010			Far	0.015		
			Elevated	0.018			Elevated	0.020		
8	HP2190	7/11/2007	Mid	0.037	2.0		Mid	0.011	1.7	
			Far	0.008			Far	0.010		
			Crawlspace	0.008			Crawlspace	0.018		
9	HP2190	6/27/2007	Mid	0.342	1.9	3/24/2008	Mid	0.218	1.1	
			Far	0.067			Far	0.028		
10	HP2190	8/3/2007	Mid	0.049	1.9		Mid			No access to this property on 3/24 or 3/25/2008
			Far	0.029			Far			
12	HP2190	8/13/2007	Mid	0.094	1.7		Mid		1.7	No access to this property on 3/24 or 3/25/2008
			Far	0.034			Far			
			Crawlspace	0.024			Crawlspace			
13	HP2190	8/13/2007	Mid	0.017	2.0	3/24/2008	Mid	0.019	1.9	
			Far	0.013			Far	0.023		
14	HP2190	6/20/2007	Mid	0.014	0.4	3/25/2008	Mid	0.025	0.4	
			Far	0.012			Far	0.011		
			Crawlspace 1	0.055			Crawlspace 1	0.020		
			Crawlspace 2	0.006			Crawlspace 2	0.008		
			Crawlspace 3	0.028			Crawlspace 3			No access to crawl space 3 on 3/25/08. Garage locked.
15	HP2190	10/4/2007	Mid	0.028	0.8	3/24/2008	Mid	0.018	0.8	
			Far	0.014			Far	0.013		
			Crawlspace 1	0.010			Crawlspace 1	0.014		
			Crawlspace 2	0.039			Crawlspace 2	0.027		

		PERFORMANCE								
		Original System Startup Results				Final System Startup Results				
Property	Fan Size	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Special Conditions
16	HP190	8/17/2007	Mid	0.03	2.4	3/25/2008	Mid	0.023	2.0	
			Far 1	0.014			Far 1	0.010		
			Far 2	0.013			Far 2	0.017		
			Far 3	0.012			Far 3	0.045		
			Crawlspace - Mid	0.011			Crawlspace - Mid			No access to crawl space on 3/25/2008. Barn door locked.
			Crawlspace - Far	0.016			Crawlspace - Far			No access to crawl space on 3/25/2008. Barn door locked.
17	HP2190	8/8/2007	Mid	0.010	1.9	3/24/2008	Mid	0.013	2.0	
			Far	recheck			Far	0.038		Double checked reading in far monitoring point. Higher than mid is correct.
18	HP2190	8/3/2007	Mid	0.009	1.9		Mid			No access to this property on 3/24 or 3/25/2008
			Far 1	0.006			Far 1			
			Far 2	0.015			Far 2			
19	HP2190	8/8/2007	Mid	0.045	1.9	3/25/2008	Mid	0.068	1.9	
			Far	0.02			Far	0.027		
			Crawlspace	0.012			Crawlspace	0.008		
21	HP2190	6/22/2007	Mid	0.027	1.3	3/25/2008	Mid	0.027	1.3	
			Far	0.023			Far	0.019		
			Elevated	0.013			Elevated	0.046		
22a	HP2190	9/21/2007	Mid	0.295	1.4		Mid		1.3	No access to this property on 3/24 or 3/25/2008
			Far	0.289			Far			
22b	HP2190	9/21/2007	Mid	0.268	0.8		Mid			No access to this property on 3/24 or 3/25/2008
			Far	0.196			Far			
22c	HP2190		Mid				Mid			No access to this property on 3/24 or 3/25/2008
			Far				Far			
23	HP2190	6/22/2007	Mid	0.020	2.0	3/25/2008	Mid	0.018	1.9	
			Far	0.015			Far	0.009		
			Crawlspace				Crawlspace	0.047		
24	HP2190	6/15/2007	Mid	0.110	2.0	3/24/2008	Mid		1.8	No access to Mid monitoring point on 3/24/08 due to clutter
			Far	0.237			Far	0.021		
			Crawlspace				Crawlspace			No access to crawl space on 3/24/2008. Door locked.
25	HP2190	8/13/2007	Mid	0.013	0.3	3/24/2008	Mid	0.016	1.8	
			Far	0.015			Far	0.011		
			Crawlspace	0.009			Crawlspace	0.025		
26	HP190	6/6/2007	Mid	0.028	2.2		Mid			No access to this property on 3/24 or 3/25/2008
			Far	0.985			Far			
			Bulkhead	0.013			Bulkhead			
			Crawlspace	0.008			Crawlspace			
27	HP2190	10/4/2007	Mid	0.099	0.9	3/24/2008	Mid	0.048	0.8	
			Far	0.036			Far	0.017		
28	HP2190	6/15/2007	Mid	0.056	0.7		Mid			No access to this property on 3/24 or 3/25/2008
			Far	0.011			Far			
			Elevated	0.008			Elevated			
29	HP2190	9/27/2007	Mid	0.048	2.0	3/24/2008	Mid	0.036	1.9	
			Far 1	0.015			Far 1	0.020		
			Far 2	0.020			Far 2			
30	HP2190		Mid			3/25/2008	Mid	0.042	2.0	
			Far				Far			No access to far monitoring point on 3/25/2008 due to excessive clutter.
			Crawlspace				Crawlspace			No access to crawl space on 3/25/2008 due to trash piled against door.
31	HP2190	9/21/2007	Mid	0.024	1.8	3/24/2008	Mid	0.033	1.5	

		PERFORMANCE								
		Original System Startup Results				*Final System Startup Results*				
Property	Fan Size	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Date	Monitoring Point	Reading (in. WC)	Initial Manometer Reading (in. WC)	Special Conditions
			Far	0.019			Far	0.014		
			Crawlspace 1	0.012			Crawlspace 1	0.010		
			Crawlspace 2	0.018			Crawlspace 2	0.008		
			Crawlspace 3	0.014			Crawlspace 3	0.013		
32	HP190	6/20/2007	1-Mid	0.011	1.9	3/25/2008	1-Mid	0.011	1.4	
			1-Far	0.011			1-Far	0.008		
			2-Mid	0.074			2-Mid	0.045		
			2-Far	0.009			2-Far	0.008		
			3-Mid	0.062			3-Mid			No access to shed monitoring points due to lawn equipment stored in shed.
			3-Far	0.003			3-Far			No access to shed monitoring points due to lawn equipment stored in shed.
33	HP2190	7/5/2007	Mid	0.046	1.9	3/24/2008	Mid	0.031	1.9	
			Far	0.010			Far	0.013		
34	HP2190	7/11/2007	Mid	0.092	1.9	3/24/2008	Mid	0.102	2.1	
			Far	0.008			Far	0.010		
35	HP2190	8/3/2007	Mid	0.033	1.8	3/25/2008	Mid		2.4	No access to monitoring points on 3/25/2008 due to excessive clutter
			Far	0.014			Far			
36	HP2190	8/3/2007	Mid	0.066	2.0	3/25/2008	Mid	0.073	2.0	
			Far	0.016			Far	0.017		
37	HP2190	9/24/2007	Mid	0.065	1.9	3/24/2008	Mid	0.014	2.0	
			Far 1	0.009			Far 1	0.011		
			Far 2	0.015			Far 2	0.121		
			New Slab	0.013			New Slab	0.011		
38	HP2190	8/13/2007	Mid	0.021	2.0		Mid		1.8	No access to this property on 3/24 or 3/25/2008
			Far	0.017			Far			
39	HP2190	9/20/2007	Mid	0.231	1.0	3/25/2008	Mid	0.010	1.9	
			Far	0.145			Far	0.014		
40	HP2190	8/13/2007	Mid	0.039	1.9	3/24/2008	Mid	0.041	1.8	
			Far	0.009			Far	0.020		
			Crawlspace	0.012			Crawlspace	0.021		
41	HP2190	6/15/2007	Mid	0.014	2.0	3/24/2008	Mid	0.013	2.0	
			Far	0.008			Far			Far monitoring point inaccessible on 3/24/2008 due to clutter
42	HP2190	9/5/2007	Mid	0.061	1.8	3/24/2008	Mid	0.034	1.6	
			Far	0.032			Far	0.013		
B	GP501	8/14/2007	Mid	0.022	0.1		Mid			GP501 Fan Not Replaced. No system startup performed in March 2008.
			Far	0.02			Far			

in. WC = inches of water column

NYANZA TASK ORDER SUMMARY - 25Mar08

		Direct Fund Cite	Revised Reimb.	Total
	Total Funding	**1,438,194**	**255,157**	**1,693,351**
	Contract Actions to Date			
T.O. 5	Develop Work Plan	50,555		
T.O. 6	Pre-Construction Meetings	39,226		
T.O. 6 Mod 1	Extend Period of Performance to 28Apr07	0		
T.O. 6 Mod 2	Extend Period of Performance to 2May07	0		
T.O. 6 Mod 3	Install Vapor Mitigation Systems Ph 1	822,768		
T.O. 6 Mod 4	Install Vapor Mitigation Systems Ph 2 (Remaining 10 Properties)	158,599		
T.O. 6 Mod 5	Change in Wage Determination, No cost mod	0		
T.O. 6 Mod 6	PCRs 1-10	53,616		
T.O. 6 Mod 7	PCRs 11-19 & est cost for PCR 21 minus fee	196,728		
T.O. 6 Mod 8	No Cost Mod, Extend POP to 30 Nov07	0		
T.O. 6 Mod 9	Extend O&M to 31Mar08, PCRs 20-22	22,217		
T.O. 6 Mod 10	Replacement of 29 Fans	26,995		
	TOTAL AWARD TO DATE	**1,370,704**		
	Unobligated Balance	**67,490**		
	PROJECT CHANGE REQUESTS	**Submitted Costs**		
PCR No. 1	Fees for 3 Building Permits	146		
PCR No. 2	Ball Valves	2,171		
PCR No. 3	3 CO Detectors	0		
PCR No. 4R	Asbestos Abatement	22,746		
PCR No. 5	Bldg No. 32	5,246		
PCR No. 6	Additional Concrete & Monitoring Points Lead Paint Analysis & Bldg 32 Re-point	5,448		
PCR No. 7	Fieldstone Walls	2,926		
PCR No. 8	Dranjer Connection for Sump Pits	1,396		
PCR No. 9	Bldg No. 7B, Elec System Upgrade	8,991		
PCR No. 10	Bldg No. 6, Fieldstone Wall Crack Filling	4,578		
PCR No. 11	Bldg #2 Asbestos Removal	8,802		
PCR No. 12	Addn of Bldg #12	22,017		
PCR No. 13	Addn Nobis Site Personnel # PM Cost	39,000		
PCR No. 14	Asbestos Sampling & Testing Bldg #15	1,000		
PCR No. 15	Elec System Upgrade, Bldg 2 & 3	25,000		
PCR No. 16R	ACM Abatement, Bldg 15	53,754		
PCR No. 17	Property 38 Floor Slab	4,200		
PCR No. 18	Asbestos Notification, Bldg 15	3,000		
PCR No. 19	Descope in Various Construction Quantities	-24,905		
PCR No. 20	ACM Abatement&Manhole Covers, Bldg 27	9,455		
PCR No. 21	Augmented VMS Installation, Bldg 15	75,900		
PCR No. 22	Alarm System at Town Hall	1,800		
PCR No. 23	Grading and Rolling of Staging Area	5,200		
PCR No. 24	Mod. Of 43 Condensate Bypasses	9,100		
PCR No. 25	Moisture in Switch Box Investigation	18,500		
	Total Cost of PCRs As Submitted	305,471		

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

INTERIM REMEDIAL ACTION REPORT

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE
Ashland, Massachusetts, 01721

CERCLIS ID NUMBER MAD990685422

VAPOR MITIGATION (OU2)

I. INTRODUCTION

The Nyanza Chemical Waste Dump Superfund Site ("Nyanza Site" or "Site") occupies 35 acres on the north and south sides of Megunko Road in the Town of Ashland, Massachusetts, located in Middlesex County, approximately 35 miles west of the City of Boston. Although Megunko Road is the location of commercial and industrial properties, the immediate area is dominated by dense residential development. See Figure 1.

The Nyanza Site property was occupied from 1917 to 1978 by a succession of companies involved in the production of textile dyes. The last of these companies was Nyanza, Inc. Large volumes of industrial waste water generated by these companies and containing high levels of acidity and numerous organic and inorganic chemicals, including mercury, were partially treated and discharged to a large buried concrete "vault." The vault was used as a settling basin from which liquid wastes were then discharged to the nearby Sudbury River via a small stream referred to as Chemical Brook. Chemical sludges generated by the waste water treatment processes, along with spent solvents, were disposed of in an on-Site landfill. The vault was taken out of service sometime in the late 1960's or early 1970's and filled with sludge. Nyanza, Inc. connected to the regional sewer system in March of 1970.

The first type of contamination linked to the Site was mercury, which was discovered in the Sudbury River in 1970 as part of an overall investigation of regional mercury in Massachusetts surface water bodies. Beginning in 1972, the Commonwealth of Massachusetts required Nyanza, Inc. to conduct several studies culminating in the release of a Preliminary Site Assessment Report in 1980.

The Nyanza Site was included on the original National Priorities List ("NPL") published in 1982. EPA began a fund-lead Remedial Investigation and Feasiblity Study ("RI" and "FS" or "RI/FS") in 1984. In January of 1987, EPA and the Commonwealth of Massachusetts conducted a joint removal of sludge from the vault area.

CONCURRENCES								
SYMBOL	HBO	HBO	HBO					
SURNAME	DiLorenzo	Cianciarulo	Brill					
DATE	6/30/08	6/30/08	6/30/08					

*U.S. Government Printing Office: 2001 — 715-264/96189

ROUTING AND TRANSMITTAL SLIP Date 6/30/08

(Name, office symbol, room number, building, Agency/Post)	Initials	Date
Jim DiLorenzo		6/30
Bob Cianciarulo		6/30
~~Larry Brill~~	LWB	6/30

Action		File		Note and Return	
Approval		For Clearance		Per Conversation	
As Requested		For Correction		Prepare Reply	
Circulate		For Your Information		See Me	
Comment		Investigate		Signature	
Coordination		Justify			

REMARKS

Interim RA Report for Nyanza OU2 (Vapor mitigation)